

## High Efficiency Hydrofoil and Swim Fin Designs

### **Abstract:**

Methods are disclosed for increasing lift and decreasing drag on hydrofoils and swim fins. The methods include providing a hydrofoil with a highly swept back leading edge portion and orienting the hydrofoil at a significantly reduced angle of attack in which the reduced angle of attack occurs at an angle that is substantially transverse to the hydrofoil's direction of movement through a surrounding fluid medium. The lee surfaces of the hydrofoil are provided with a substantially unobstructed flow path as well as a separation reducing contour so as to permit lift generating attached flow conditions to form along such lee surfaces. Substantially rigid structural reinforcement is provided to prevent the hydrofoil from deforming significantly during use. Methods are disclosed for providing a hydrofoil with a substantially longitudinal recess or venting system located substantially along the center axis of the hydrofoil. The attacking surfaces of such a hydrofoil are provided an anhedral contour that forms a substantially lengthwise channel with the recess or venting means located along the center axis of this lengthwise channel. Methods are disclosed for applying these lift generating and drag reducing methods to both non-flexible and flexible hydrofoil blades that are used in reciprocating propulsion strokes through a fluid medium. Also provided are methods for significantly controlling and reducing the build up of torsional stress forces within a flexible hydro foil as it is encouraged to twist to a reduced angle of attack during use.